Topic Familiarity and Input Enhancement: An Empirical Investigation

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ABSTRACT

Over the past 15 years, SLA practitioners have devoted a sizable amount of research to investigating the effectiveness of various pedagogical interventions on L2 learners' processing of input and their subsequent performance. Textual input enhancement (Sharwood Smith, 1993) and topic familiarity (Lesser, 2004) are two such approaches that researchers have investigated in this domain. The current quasi-experimental study, which involves 36 adult ESL learners, attempts to measure the impact of these two approaches upon the participants' acquisition of form. In the study, the researcher incorporates grammatical structures—vis-à-vis textual input enhancement—in a meaning-oriented ESL reading class to observe the impact on the learners. The researcher also examines the role topic familiarity plays in acquisition of form.

INTRODUCTION

In the last century, theoretical as well as pedagogical discussions concerning second language teaching have revolved around the role grammar instruction plays and what effects it has on the second language (L2) learner's ability to comprehend and communicate in the L2. At one polar extreme, the followers of the grammar translation method advocate a purely formal, decontextualized approach to language, whereas at the opposite pole, the proponents of the natural approach and other communicative language teaching methodologies de-emphasize formal concerns in proposing language instruction as a means to learning language. This tension has produced a waxing and waning of fads and fancies in language pedagogy. However, in the past 20 years, second language acquisition researchers, such as Long (1991), have attempted to bridge the gap between the two positions. The term *focus on form* was introduced by Long in order to advocate an instructional approach in which the primary focus would always be on meaning but where attention to form could be included if there was a communicative need for it. In this paper, the effects of one such instantiation of focus on form pedagogy, input enhancement (Sharwood Smith, 1993), will be investigated. In addition to input enhancement, this paper will also investigate whether topic familiarity (Lesser, 2004) contributes to or detracts from the potential benefits of input enhancement. The following review of the literature focuses on the following areas: the role of input processing and external variables, the role of instruction and the focus on form, input enhancement including visual enhancement, and topic familiarity.

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Recently, in second language acquisition (SLA) research, much attention has been given to the effects that instruction has on the L2 learner's processing of input. The distinction between input (i.e., what enters the L2 learner's processing system) and intake (i.e., what the L2 learner subsequently processes) was first made by Corder (1967). In establishing this distinction, Corder offered this prescient caveat:

> The simple fact of presenting a certain linguistic form in the classroom does not necessarily qualify it for the status of input for the reason that input is 'what goes in,' not what is available for going in, and we may reasonably suppose that it is the learner that controls this input, or more properly his intake. (p. 279)

In other words, when a particular piece of linguistic information is presented in an instructional setting, individual differences and each learner's own cognitive processing system dictate what really happens to the incoming information regardless of the intentions of the teacher. In determining what influence instruction can have on the learning process, researchers have tried to assess what possible effects external manipulations of input can have upon intake and subsequent learning. Key variables of the possible effects of external manipulations of input are: (a) the constrained nature of the L2 learner's cognitive processing system itself and the process of input selection, (b) the type, quantity, and quality of the input to which the learner is exposed, and (c) the subsequent processing of input for form and/or meaning (Doughty, 2001; Robinson, 2003; Sharwood Smith, 1991, 1993). By examining the role each of these three factors plays in the learning process, the researcher hopes to be able to clarify some of the complex aspects involved in instructed SLA.

In considering the first point (i.e., the constrained nature of the L2 learner's cognitive processing system), cognitive psychologists (McLeod & McClaughlin, 1986) as well as SLA researchers (Doughty, 2001; Robinson 2003; VanPatten 1996, 2004) have noted that because human beings have a limited capacity for processing information, the L2 learner's cognitive resources are allocated in a selective and necessarily partial way. The question of how much conscious control the L2 learner has over the input selection process has also elicited a range of responses. In Krashen's (1982) concept of *comprehensible input*, he makes a distinction between largely conscious learning and mostly unconscious acquisition. According to Krashen, conscious attempts at learning of a particular grammatical form in an instructional setting are not efficient because the L2 learner relies on a largely unconscious innate form of processing, similar to first language (L1) acquisition. Finding Krashen's characterization of L2 learning inadequate, subsequent researchers have argued that the role conscious attention plays in SLA needs to be reexamined. Some researchers (Schmidt 1990, 1994, 1995, 2001; Schmidt & Frota, 1986) have advocated for conscious attention while others have downplayed the role it plays (Tomlin & Villa, 1994).

For Schmidt (1995), conscious attention or awareness is a necessary component of second language learning whereas for Tomlin and Villa (1994) conscious attention is not necessarily a requirement. Schmidt defines attention as a form of consciousness in which learners must consciously pay attention to, or notice, input in order for second language data to become intake. Schmidt distinguishes between two different levels of awareness: (a) awareness at the level of noticing, and (b) awareness at the level of understanding. Noticing is a surface level phenomenon of the conscious registration of certain events while understanding represents a deeper level of processing involving processes such as pattern recognition or rule recognition. According to

Schmidt, while the higher level of awareness (i.e., understanding) may not always be necessary for learning, awareness at the surface level (i.e., noticing the gap) is a necessary condition for subsequent processing and learning to occur.

Tomlin and Villa (1994) call for a more nuanced definition of the role attention plays in the processing of input. Like Schmidt (1990, 1994, 1995), Tomlin and Villa argue that attention to input is necessary for SLA, but they attribute less importance to the role of awareness. They break down the concept of attention into three discrete functions: *alertness*, *orientation*, and *detection*, none of which requires awareness in order to become functional. Tomlin and Villa define alertness as an overall readiness to process incoming stimulus; orientation is a process that directs attentional resources to a particular stimulus at the exclusion of others, and detection is the registration of the stimulus. After detection has occurred, according to Tomlin and Villa, the further processing of input can occur. Unlike Schmidt, Tomlin and Villa consider awareness to be unnecessary for detection, and subsequently acquisition, to take place.

In addition to examining the role of attention in SLA, it is also important to consider a second aspect of L2 learner processing: the nature of the input to which the L2 learner is exposed. In considering this second variable, the modality, quantity, and quality of input, we can see that the modality of input (e.g., oral or written) received by the learner leads to markedly different types of processing, each of which has a different effect upon the L2 learner's processing system, with oral input following quite a different processing path than written input (Robinson, 2003). Written input potentially allows for greater learner processing time than oral input. Leeser (2004), in analyzing the effects of mode, pausing, and topic familiarity, argues that readers comprehended more propositional information than listeners did. In addition to input type, it is appropriate to consider input quantity. Due to increased cognitive demand on an L2 learner's resources, larger chunks of input require a greater depth of processing, and can place quite a high demand upon the L2 learner's processing system (Robinson, 2003). Likewise, as far as the quantity of input is concerned, input containing more complex semantic and grammatical items requires greater levels of cognitive processing.

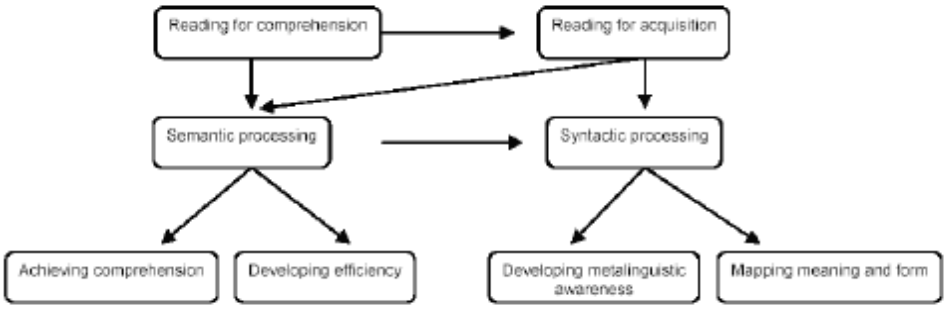
We now turn to the third variable, processing for form and/or meaning. There is evidence that a learner's cognitive processing system does not necessarily follow two discrete mental pathways (i.e., semantic and syntactic), but that the two processes overlap. Rather, individuals tend to take an integrative approach to semantic and syntactic processing. In their study of sentence fragment processing, Tyler and Marsen-Wilson (1977) argue that when syntactic and semantic information are in conflict, participant comprehension slows down. The weighting of which type of information the individual relies on (i.e., syntactic or semantic) may also be determined by the participants' L1, as Bates, McNew, MacWhinney, Devesocvi, and Smith (1982) contend. In their study, Bates et al. compare how American and Italian participants interpret the sentence, "The eraser bites the dog," or its Italian equivalent, "La gomme morde il cane." The researchers found that Americans almost always follow the syntax of the sentence and interpret the sentence to mean that the eraser is doing the biting, while the Italians prefer to draw upon the semantics of the sentence interpreting it to mean that the dog is biting the eraser.

The nature of individual syntactic and semantic processing has also been studied in an SLA context. SLA researchers, such as VanPatten (1996, 2004), have explored the dual pathways through which the L2 learner processes written input: the semantic one (i.e., processing for meaning) and the syntactic one (i.e., processing for form). For VanPatten (1996), learner processing for meaning occurs in three stages: (a) the initial stage of perception of input, (b) the subsequent stages of recoding and encoding of the semantic information into long-term memory,

and (c) the incorporation of the linguistic items contained in the input into the learner's developing grammar. In a later refinement of his notion of processing, VanPatten (2004) stated that, initially, learners almost always process input for meaning as a default strategy.

Han (2003) drew upon VanPatten's (1996) notion of input processing in formulating her *dual approach to L2 reading instruction*. In her model, Han favors an instructional outlook that allows L2 readers to process a text for form (syntactic processing), while maintaining an instructional focus on reading for meaning in series of steps (see Figure 1). First, the learner is engaged in reading for comprehension, and subsequently s/he is engaged in reading for acquisition. Reading for comprehension triggers semantic processing, and reading for acquisition activates syntactic processing. This model is referred to as a dual processing model, because both types of processing occur as the learner reads a text.

FIGURE 1
The Dual Approach to L2 Reading (Han, 2003)



Approaches such as Han's (2003) show the important role instruction can play in SLA and how external manipulation of the input may affect subsequent processing. One interesting aspect of Han's model is that reading for acquisition includes not only syntactic processing but also requires semantic processing. Such an approach reminds us of the need for a primary focus on meaning even when attempting to focus on form, which Long (1991) outlined in his initial conceptualization of focus on form.

Focus on Form and the Role of Instruction in SLA

In his highly influential paper, Long (1991) drew an important distinction between pedagogical interventions that draw learners' attention to form within a meaning-based context, which he labels *focus on form*, and those that occur outside of a meaning-based context, which he refers to as *focus on forms*. By distinguishing between the two terms, Long wants to highlight the primary importance of meaningful language in the classroom and to discourage anyone from inferring that he is calling for a return to traditional grammar instruction. The term focus on form was introduced by Long in order to advocate an instructional approach in which the primary focus would always be on meaning but where attention to form could be included if there was a communicative need for it. Later, Long and Robinson (1998) expand this definition to include a role for both teacher- and learner-initiated focus on form in allocating attentional resources. "Focus on form often consists of an occasional shift of attention to linguistic code features—by the teacher and/or one of the students—triggered by perceived problems with comprehension or production"

(Long & Robinson, 1998, p. 23; see, however, Han, 2007). The original definition of focus on form seems to exclude pedagogical practices that require a proactive rather than a reactive response to attention to form. In essence, focus on form is not planned, but arises spontaneously while learners are engaged in a meaningful, communicative activity. In a subsequent development, the term focus on form has been adopted by researchers in a much broader sense to include both proactive and reactive types of pedagogical strategies (see Doughty, 2001, 2004; Doughty & Williams, 1998; Spada, 1997). In outlining focus on form pedagogical practices, Doughty and Williams (1998) used a continuum to highlight the degree of implicitness or explicitness involved in each activity. They position more obtrusive, rule-based, and overt strategies such as consciousness-raising and the garden path technique on the more explicit end of the continuum, while placing unobtrusive, exemplar-based, and incidental strategies such as input flood and input enhancement on the more implicit end of the continuum.

Input Enhancement

One more implicit instantiation of pedagogical focus on form is input enhancement. Initially conceived as *consciousness-raising* (Sharwood Smith, 1981), input enhancement is a term devised by Sharwood Smith (1991) to denote a deliberate attempt to make specific features of L2 input more salient in order to draw the learner's attention to them. Sharwood Smith (1981) first introduced the concept of consciousness-raising as a reaction to Krashen's (1981) assumption that formal grammar instruction serves little, if any, purpose in the second language classroom. In challenging this assumption, Sharwood Smith (1981) and Rutherford and Sharwood Smith (1985) emphasize that since the roles consciousness and metalinguistic awareness play in facilitating language acquisition are inconclusive, they need to be reexamined. Rutherford and Sharwood Smith characterize consciousness-raising or input enhancement as being "highly complex and variegated" (p. 275) and not being limited to formal grammar instruction techniques such as metalinguistic explanations.

Sharwood Smith (1981, 1991) further explains that input enhancement techniques vary in their degrees of explicitness and elaboration. Explicitness in this case refers to the amount of detail in a given technique, whereas elaboration indicates the amount of time needed to implement it. Thus, at the highly explicit end of the continuum, one may find metalinguistic rule explanation, whereas at the less explicit end, one sees typographical highlighting of the targeted form. Likewise, if the instructor indicates a mistake with a facial gesture only once, it would be less elaborate than if this occurs each time an error is committed. In essence, Sharwood Smith (1981, 1991, 1993) wants to stress that there are many forms of input enhancement when it comes to drawing learner attention to grammatical forms.

In discussing learner attention to input, Sharwood Smith (1991) notes that input enhancement is necessarily limited to external manipulations of the input. The salience of a particular form will theoretically improve the chances that the learner will attend to the form. However, Sharwood Smith (1993) offers the following caveat: "Input enhancement implies only that we can manipulate aspects of the input but makes no further assumptions about the consequences of that input on the learner" (p. 176). Thus, while input enhancement may cause learners to pay more attention to a given form, Sharwood Smith (1991, 1993) realizes that there exists no guarantee that the form will become intake, or will subsequently lead to greater levels of learning. This echoes Corder's (1967) assertion that it is the learner him- or herself that controls what becomes intake.

Previous Studies of Visual Input Enhancement

As noted earlier, input enhancement via textual manipulations has been designed as an unobtrusive and mostly implicit way of drawing a learner's attention to the element of form in the input. The basic method used in visual input enhancement is simply to increase the perceptual salience of the target form by utilizing combinations of various formatting techniques (e.g., bolding, capitalizing, or underlining), which in some cases may be accompanied by an explicit instruction to consider the highlighted form. When a particular form has been chosen as a target, it is embedded in the overall text. This way, the researcher tries to increase the probability that the L2 learner will notice a given linguistic form.

Previous studies of visual input enhancement have involved varying the treatment length and exposure to the input. Most of the L2 studies have involved short-term treatments with somewhat limited exposure (in terms of both time and quantity) to the input (Alanen, 1995; Jourdenais, Ota, Stauffer, Boyson, & Doughty, 1995; Leow, 1997, 2001; Leow, Egi Nuevo, & Tsai, 2003; Overstreet, 1998; Shook, 1994; Wong, 2003). However, a few of the studies have involved greater treatment length with a greater amount of exposure to the input (Doughty, 1991; White, 1998). As noted by Han, Park, and Combs (2008), it is unrealistic to expect instant learning to occur with a one-time treatment, as the short treatment alone does not give the learners sufficient time for deeper processing of the input. However, as Han et al. suggest, if one-time treatments are measured by their effects on noticing rather than being viewed as an underlying catalyst for acquisition itself, the results may be more fruitful. Other design features in these various studies also make a direct comparison difficult (if not highly problematic).

Certain other factors are of importance when attempting to evaluate the relative success or failure of the treatments described in these studies. First, not all of these studies used input enhancement alone as a means of inducing the desired learning effect. To cite a few examples, Williams' (1999) study, which showed that visual input enhancement has beneficial effects, used a form-focused verbatim recall task in conjunction with visual enhancement. The recall task may have helped the participants to notice the form better than visual enhancement alone would have. White's (1998) participants received enhanced input in conjunction with input flood, extensive reading, and listening. White's study leaves us with an unclear picture at best of what the effects of visual enhancement itself really are as the participants were exposed to several instances of the targeted form via input flood. Input flood may also have been a factor, in addition to visual enhancement, in Leow et al.'s (2003) study where the participants were exposed to 10 tokens of the targeted linguistic form in a 222 or 227 word treatment text, thus making the results ambiguous with regard to the effects of input enhancement alone.

Second, many of the studies utilized varying measures of assessing the degree of noticing that occurred while some of the studies did not measure noticing at all. The studies that did measure noticing provide some intriguing evidence regarding the nature and degree of noticing that occurred. Leow's (2001) study and Bowles' (2003) replication thereof showed in verbal think-aloud reports given online during the task itself that visual enhancement has no effect on noticing. While the use of think-aloud data has introduced the problem of reactivity into the experimental picture, Leow and Morgan-Short (2004) did not find this to be a problem in a follow-up study, which attempted to measure the impact of reactivity on the post-exposure task performance of the participants. White's (1998) study also yielded an interesting finding on noticing. In her analysis of

the noticing data, White found that her participants may have reported noticing a targeted form, but they were unsure of its relevance or importance. All of this indicates a relative lack of consistency not only in the measurement of noticing itself (i.e., online vs. offline data), but also in the effects of reported noticing upon the learners' subsequent processing of the input.

A third issue in previous studies involves learner readiness, or the students' developmental level as it pertains to a given targeted linguistic form. As Pienemann (1989) and Han et al. (2008) suggest, learner readiness must be considered *a priori* to the treatment as it may constrain the effects thereof. This could be the reason why a number of the studies achieve limited results. Two of the studies (Doughty, 1991; White, 1998) provided a measure of assessing the learnability of the targeted form for a given group of learners prior to the start of the treatment. White (1998) found connections between participant performance on the pre- and post-test tasks and the learners' overall developmental sequence, thereby enabling her to more accurately gauge individual student performance in the case of exposure or non-exposure to the treatment. By adopting fine-grained measures (see Han et al., 2008), overall learner development can be more fully viewed as a factor in the study of visual input enhancement. Previous studies of visual input enhancement are summarized in Table 1.

TABLE 1
Previous Studies of Visual Input Enhancement

Author(s) of Study	Length of Treatment	Targeted Linguistic Form	Number of participants	Pre Treatment and Post Treatment Measures	Treatment Results
Doughty (1991)	10 days	English Relative Clauses	20	Comprehension questions; Free recall task; Grammaticality judgment task; Sentence combination task; Guided sentence completion task; Oral task	Positive effect on acquisition of form
Shook (1994)	2 day period less than 1hr	Spanish present perfect/relative pronouns	125	Recognition task; Fill-in-the blank production task	Positive effects on acquisition
Alanen (1995)	2 day period less than 1hr	Finnish locative suffixes/consonant gradation	36	Sentence completion task; Grammaticality judgment task; Rule statements	Facilitating effect on learner recall and use of targets
Jourdenais et al. (1995)	Less than 1 hr	Spanish preterit/imperfect	10	Think-aloud protocols; Picture-based writing task	Positive effects on intake and noticing
Leow (1997)	Less than 1 hr		84	Short-answer comprehension task; Multiple-choice form recognition	Effect for text length but no effect for intake

				task	
Robinson (1997)	One 25 min session and one 2 min session	English novel verbs (dative alternation)	60	Grammaticality judgment task; Debriefing questionnaire	Limited effects
White (1998)	10 hrs over a 2 week period and 2 to 3 hrs a week over a 5 month period	English possessive determiners	86	Passage correction task; Multiple-choice test; Oral picture description task	Partial effects on acquisition
Williams (1999)	Between 1 hr and 40 min and 2 hrs	Italian possessive adjectives, inflectional verb-endings for subjects	58	Verbatim memory task; Translation task	Positive effect
Leow (2001)	Less than 1 hr	Spanish imperatives	38	Short-answer and multiple choice task; Multiple-choice recognition task; Fill-in the blank production task; Think-aloud protocols	No effect on intake or on participants' reported noticing
Bowles (2003)	Less than one hr	Spanish imperatives	15	Short-answer and multiple choice task; Multiple-choice recognition task; Fill-in the blank production task; Think-aloud protocols	No effect on intake, reported noticing, or comprehension
Leow et. al. (2003)	Less than 1 hr	Spanish present perfect	72	Multiple-choice comprehension task; Multiple-choice form recognition task; Think-aloud protocols	No effects on intake or noticing
Wong (2003)	3 day period, less than one hr	French past participle agreement in relative clauses	81	Free recall task; Error correction task	No effects on acquisition

Topic Familiarity and Narrow Reading

In order to fully understand both aspects of the dualistic nature of learner second language processing (i.e., semantic and syntactic), we need to consider theoretical (i.e., topic familiarity) as well as pedagogical accounts (i.e., narrow reading) of processing for meaning in addition to the approaches examined previously (i.e., input enhancement). In second language reading research,

much attention has been paid to schema-based models of L2 learner comprehension (Carrell, 1987; Carrell & Eisterhold, 1983; Rummelhart, 1977) in which familiar topics can be used for greater text comprehension. There is an interaction between the text itself and the background knowledge stored in the readers' long-term memory. By activating background knowledge either in a top-down fashion via content schemata (Carrell, 1987) and scripts (Schank & Abelson, 1977) or in a bottom-up fashion via associative cognitive networks (Kintsch, 1998), reader familiarity with text content appears to aid overall comprehension. Certain studies of reading and topic familiarity show that greater familiarity leads to greater text comprehension and retention of the material contained in the text (Johnson, 1982; Pritchard, 1990). However, in another study of the effect of topic familiarity, in conjunction with other factors, on L2 learners' acquisition of form, Lesser (2004) found that while the three variables of topic familiarity, mode, and pausing affected the comprehension of the learners, only mode influenced their ability to process future tense morphology. Thus, in some, but not all, cases, the level of topic familiarity affects comprehension.

One instructional technique, narrow reading, which was devised by Krashen (2004), takes into account the level of topic familiarity in the creation of course syllabi and selection of materials. As opposed to many textbooks and courses which incorporate a wide variety of topics jumping quickly from one to another, narrow reading takes an opposite route by specializing in one topic or, in some cases, one author. For Krashen (2004), the case for narrow reading is based on the idea that the acquisition of both structure and vocabulary is the result of multiple exposures to a given topic in a comprehensible context. In other words, the single focus on one topic has a beneficial impact upon acquisition and overall comprehension.

Previous Studies of Topic/Content Familiarity and Visual Input Enhancement

Researchers have attempted to empirically examine the concurrent effects of topic (or content) familiarity and input enhancement. Two previous studies of topic/content familiarity and input enhancement (i.e., Lee, 2007, and Overstreet, 1998) found that the effects on the participants' meaning comprehension and learning of form varied. Overstreet (1998) examined the effects of textual enhancement and content familiarity by using the preterit and imperfect tenses as linguistic targets. His participants were 50 third semester students of Spanish who had received previous instruction in the linguistic targets. Two treatment texts were used: the familiar one being a version of "Little Red Riding Hood" and the unfamiliar one being "Carta a Dios." The enhanced text contained typographically highlighted examples of both the preterit and imperfect forms. Overstreet found that the unenhanced groups outperformed the enhanced groups in comprehension, and that enhancement had no effect on learning of the linguistic form. Based on these results, the researcher hypothesized that the enhancement had distracted attention away from meaning. However, given the participants' previous instructional exposure to the form as well as the short, one-shot nature of the treatment itself, this conclusion appears to be somewhat overreaching.

Lee (2007) conducted a quasi-experimental study of 259 Korean L2 English learners by exposing four experimental groups to four different treatment conditions: familiar/enhanced, familiar/unenhanced, unfamiliar/enhanced, and unfamiliar/unenhanced. Each participant was exposed to three different treatments involving either enhanced or unenhanced texts. In the third treatment, Lee measured the role topic familiarity played in addition to textual enhancement. For the third treatment, she selected a passage on birthday celebrations in Korea as the familiar text and a passage on traditional Egyptian beliefs about eternal life as the unfamiliar text. The treatment occurred over a two-week period with the first and second exposures taking place during week one

and the third exposure taking place during week two. The participants carried out a form correction task of the English passive and did a free recall of the text in which they wrote down every idea that they could remember. The recall was used to measure comprehension, and the researcher subsequently analyzed the total number of idea units that the participants recorded. Like Overstreet (1998), Lee found that visual input enhancement had a detrimental effect on comprehension. However, visual input enhancement aided the students learning of the target form while topic familiarity was seen to be beneficial to student comprehension and to have no effect on the learning of form. Although we can see that both studies achieved somewhat mixed results, and because of the limited nature of the treatment periods, it is impossible to draw broad conclusions.

THE CURRENT STUDY

We hope that a more complete picture of the dual nature of L2 learners' processing will emerge from the current research. By focusing on the effects of topic familiarity on learners who have also received typographically enhanced input, we will hopefully gain a better understanding of how instructional manipulations of input may affect subsequent processing (or intake). Textual enhancement was used as a focus on form technique to assist the learners in the allocation of attention to form while reading the treatment text. As an additional variable, topic familiarity was used as another potentially facilitative procedure to improve the dual task performance of the learners. This present study considered the following research questions:

1. How does typographical enhancement of a given form within a reading text affect the participants' acquisition of form?
2. What are the effects of topic familiarity on the participants' acquisition of form within a reading text?
3. To what extent does topic familiarity in combination with typographical enhancement affect the level of acquisition of form?

Participants

The participants were 36 lower-intermediate level students enrolled in an English as a second language (ESL) grammar course at a business college in lower Manhattan. Their level was determined by an in-house placement test that the school administered. The researcher was not allowed access to the participants' placement test scores. The course followed a grammar-based syllabus. The students had just begun their first semester of study and were in the second week of a fifteen week semester of study at the school. The students received about four hours of ESL instruction, three days a week. The breakdown of the participants' L1s was approximately 70% Chinese (40% Cantonese and 30% Mandarin) and 30% Spanish. The participants were 85% female and 15% male. The participants were young adults who ranged in age from 18 to 28. The research was conducted in intact classrooms in which the researcher was the participants' instructor for one or two of the four instructional hours that the participants received five days a week. Two instructors were used because the school where the research was conducted only allowed this particular arrangement. The two instructors as well as a member of the school administration observed both classes.

The participants were divided into three experimental groups and one control group. The first experimental group (Group A, n=11) received textually enhanced materials and topic

familiarity training. The second experimental group (Group B, n=8) received no topic familiarity training but was exposed to textually enhanced materials. The third experimental group (Group C, n=6) received topic familiarity training with no textually enhanced materials. The control group (Group D, n=11) received neither topic familiarity training nor textually enhanced materials. The size of the groups was uneven due to two factors: participant mortality and the school's allotment of class size.

Target Linguistic Form

The choice of linguistic target was based upon the results of two grammatical pre-tests. The first pre-test was a 25-item multiple choice test and the second pre-test was a 25-item, fill-in-the-blank cloze test. There were a total of 50 items on the pre-test and the post-test. The linguistic targets on the pre-tests were all taken from the syllabus for the grammar course in which the students were enrolled. Based upon the results of the pre-test, the grammatical form chosen as a target-form in this project was the inflectional superlative. Although other items on the pre-test scored similarly low as the targeted form, the inflectional superlative was chosen because it was to be taught in week 14 of the 15-week syllabus for the grammar component of the ESL course. By choosing materials from a later point in the semester, it was believed that there would be less chance that the participants would already have been exposed to those forms, whereas a grammatical form such as the past tense that had been studied earlier in the course sequence (e.g., in week 4) may have impacted upon learners' prior knowledge, thus interfering with the results.[2]

Choice of Topic Training Target

The participants were given three pre-test tasks in order to measure their familiarity with ten topics chosen by the researcher. The first task asked the participants to rate their degree of familiarity with each topic on a five-point Likert scale. The second task was a semantic web activity in which the participants were asked to name three words that they associated with each topic. The third task required the participants to circle words associated with the topic that they knew. The participants were given 15 minutes to complete the three tasks. Based on the results of the topic familiarity pre-treatment tasks, penguins were chosen as the topic with which the participants had the least degree of familiarity. Although other topics elicited a similarly low degree of familiarity, this topic seemed the most appropriate, as some of the others appeared too complex given the time constraints of the training phrase and the level of the participants. Table 10 in the Appendix shows the mean scores for the three parts of the pre-test on topic familiarity.

Procedure

The study was conducted in a three-week time period (see Table 2) during weeks 2, 3, and 4 of the 15-week semester at the business college. The participants in each of the four experimental groups followed the following timeline:

[2] However, one problem was that the pre- and post-test instruments used by the research did not adequately measure the form (Table 9 in the Appendix). Only four items on both the pre-test and the post-test were used to measure the superlative, as seen in Table 9 in the Appendix.

TABLE 2
Timeline of the Study

Week of the study	Group A (+IE, +TF)	Group B (+IE, -TF)	Group C (-IE, +TF)	Group D (-IE, -TF)
Week 1	2 linguistic pre-test tasks (40 minutes), topic familiarity pre-test (15 minutes)	2 linguistic pre-test tasks(40 minutes), topic familiarity pre-test (15 minutes)	2 linguistic pre-test tasks (40 minutes), topic familiarity pre-test (15 minutes)	2 linguistic pre-test tasks (40 minutes), topic familiarity pre-test (15 minutes)
Week 2	2 topic familiarity training sessions (approximately 30 minutes each)	None	2 topic familiarity training sessions (approximately 30 minutes each)	None
Week 3	Enhanced text (15 minutes) , written recall (10 minutes), 2 linguistic post-test tasks (40 minutes)	Enhanced text (15 minutes), written recall (10 minutes), 2 linguistic post-test tasks (40 minutes)	Unenhanced text (15 minutes), written recall (10 minutes), 2 linguistic post-test tasks (40 minutes)	Unenhanced text (15 minutes), written recall (10 minutes), 2 linguistic post-test tasks (40 minutes)

IE = input enhancement TF = topic familiarity

Topic Familiarity Stimulus Materials

Group A and Group C were exposed to the topic familiarity training materials during two approximately 30-minute training sessions. Due to the time constraints of the experimental period (the school only allowed this period of time to conduct the research), the familiarity training was limited to two sessions. The text, "Discovering Penguins" (n.d.), was chosen not only because it was short in length, but also because the language level seemed appropriate for the experimental groups. The first text consisted of 156 words and the second text consisted of 72 words. Before reading text number one, the participants were asked to answer four questions concerning penguins. These pre-reading questions were included in order to activate the participants' prior knowledge of the topic. Immediately after reading text one, the participants attempted to answer the same four questions. The researcher provided feedback and explanations to the participants during the post-phase of the session in order to ensure that the participants had understood the text. The second topic familiarity session was conducted in a similar fashion with three pre-reading questions and three post-reading questions in order to activate the learners' prior knowledge and ensure the participants understood the text. It was hoped that during both training sessions the participants would gain familiarity with the topic through the use of genuine textual materials. Due to the time constraints of the experimental period, the familiarity training was limited to only two sessions.

Stimulus Material for Input Enhancement

The text for the typographical enhancement "Antarctica" (n.d.) was selected because it contained many tokens of the targeted linguistic form. The text is 347 words long and contains ten tokens of the targeted linguistic form, the superlative. The participants were given fifteen minutes

to read the text. They were then given 35 minutes to complete the written recall described below and the two post-tests.

Written Recall

Following the reading of the input enhancement treatment passage in which Group A and Group B read a textually enhanced version of the passage and Groups C and D read an unenhanced version of the passage, a written recall was conducted in order to see what the participants could recall from the reading. In administering the written recall, the researcher adhered to certain established procedures (Gass & Mackey, 2000; Mackey & Gass, 2005): (a) in order to increase the likelihood of the participants remembering the text, the recall was conducted immediately after they had finished reading the textually enhanced or unenhanced material, (b) the researcher used a fairly unstructured prompt in order to minimize researcher interference, and (c) the participants received minimal training in carrying out the task. The prompt for the task was "Please write down what you recall from the passage," and it was translated into Spanish and Chinese. No verbal instructions were given. The participants were allowed 10 minutes to complete the recall. The recall could be written in Chinese, Spanish, or English. For recalls written in either Chinese or Spanish, a native-speaking translator was used to translate the protocols into English for analysis by the researcher.

Results for Linguistic Pre-test and Post-test

For the first treatment group, Group A (+IE, +TF), descriptive statistics were obtained on the pre-test and the post-test (see Table 3). A cursory glance at the table indicates a slight increase in scores between the pre-test total mean and post-test total mean.

TABLE 3
Descriptive Statistics for Group A (+IE, +TF)

	N	Minimum	Maximum	Mean	Std. Deviation
Pretotal	11	15.00	40.00	30.2727	7.63008
Posttotal	11	25.00	44.00	35.0000	6.40312
Pretl	11	.00	2.00	1.1818	.75076
Posttl	11	.00	3.00	1.3636	1.02691

Note: Pretl and Posttl refer to the scores obtained for the targeted linguistic form items on the pre- and post-test.

Due to the small size of the experimental group, a two-way ANOVA was not feasible. The small sample size and variation in the test scores of the participants in this group made it necessary to do a means comparison and one-way ANOVA to measure the effects of both input enhancement and topic familiarity across the total number of participants. The one-way ANOVA was conducted to measure the possible effects of the treatment upon student learning.

In comparing the means of the unenhanced and the enhanced treatment groups (see Table 4), we can see that the pre-test total for the targeted linguistic form was lower for the enhanced group than for the unenhanced group. Also, both the enhanced group and the unenhanced group appear to have received higher scores in the targeted linguistic form on the post-test than on the

pre-test. This suggests that their knowledge may have improved. However, two results stand out in reporting the means. One, the unenhanced group's mean score on the post-test, which was calculated for the targeted linguistic form, remains higher at 1.9412 than the enhanced group's mean score on the post-test, which was calculated for the targeted linguistic form at 1.6842. And two, the size of the standard deviation in both groups indicates a large degree of variation in both groups.

TABLE 4
Means and Standard Deviation for the +Enhancement and –Enhancement Groups

Group	n	Mean	SD
+ Enhancement (pre-test total)	19	30.8421	7.29736
-Enhancement (pre-test total)	17	34.5882	7.5886
+Enhancement (post-test total)	19	35.1053	6.08180
-Enhancement (post-test total)	17	34.00	9.40744
+Enhancement (pre-test target linguistic form)	19	1.2105	.85498
-Enhancement (pre-test target linguistic form)	17	1.6471	1.9412
+Enhancement (post-test target linguistic form)	19	1.6842	1.15723
-Enhancement (post-test target linguistic form)	17	1.9412	1.24853

In looking at the results of a one-way ANOVA of the pre- and post-test scores of the linguistic target (see Table 5), there was no effect for enhancement on the change in score. The post-test $F(1,34)=.411$, $p>.05$ shows no effect of enhancement on the linguistic target post-test scores.

TABLE 5
Results of One-way ANOVA Analysis for Textual Enhancement

		Sum of Squares	df	Mean Square	F	Sig.
pretl	Between Groups	1.710	1	1.710	1.873	.180
	Within Groups	31.040	34	.913		
	Total	32.750	35			
posttl	Between Groups	.592	1	.592	.411	.526
	Within Groups	49.046	34	1.443		
	Total	49.639	35			

Note: *Pretl* and *Posttl* refer to the scores obtained for the targeted linguistic form items on the pre- and post-test.

In looking at the results of the topic familiarity training for the group as a whole (see Table 6), we can see that the unfamiliar group showed a much larger increase in their scores on the targeted linguistic form from the pre-test to the post-test, going from 1.3158 to 2.000 as compared to the familiar group (1.5294 to 1.5882). Again, as can be seen in the standard deviation for both groups, a large variation exists in the performance of the participants not only in answering the targeted items, but also in answering the items contained on both the pre-test as well as the post-test as a whole. In the table below, one can see the pre- and post-test scores for the familiar and unfamiliar groups as well as the pre- and post-test scores for the targeted linguistic form.

TABLE 6
Means and Standard Deviation for the +Topic Familiarity and –Topic Familiarity Groups

Groups	n	Mean	SD
+Familiarity (pre-test total)	17	32.2941	8.78752
+Familiarity (post-test total)	17	35.8824	7.24467
-Familiarity (pre-test total)	19	32.8947	6.50551
-Familiarity (post-test total)	19	33.4211	8.16031
+Familiarity (pre-test target linguistic form)	17	1.5294	1.0073
+Familiarity (post-test target linguistic form)	17	1.5882	1.17574
-Familiarity (pre-test target linguistic form)	19	1.3158	.94591
-Familiarity (post-test target linguistic form)	19	2.0000	1.20185

In the one-way ANOVA of the topic familiarity training (see Table 7), the effects of topic familiarity treatment on the change in score were statistically insignificant. With an $F(1, 34) = 1.057$, $p>.05$, we can see that there were no measurable effects of topic familiarity on the post-test for the targeted linguistic form.

TABLE 7
Results of One-way ANOVA Analysis for Topic Familiarity Training

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.409	1	.409	.430	.516
Within Groups	32.341	34	.951		
Total	32.750	35			
Between Groups	1.521	1	1.521	1.075	.307
Within Groups	48.118	34	1.415		
Total	49.639	35			

Note: *Pretl* and *Posttl* refer to the scores obtained for the targeted linguistic form items on the pre- and post-test.

Quantitative Results of Written Recall

In analyzing the contents of the written recall, a frequency count of the total words in the protocol, the number of superlative forms, and the number of content words was conducted. This procedure was carried out in order to examine whether the participants had any immediate recall of the targeted linguistic form and/or vocabulary related to the topic contained in the treatment passage (see the Appendix for the treatment passage). For the participants who completed the recall in their L1 (Spanish or Chinese), a native speaker translated their recall. In coding the protocols for superlative forms, each appearance of either the suffix (*–est*) form or the periphrastic (e.g., *the most* _____) were counted as instances of production of the targeted linguistic form, which was indicative of recall of the form. Content words refer to items that were related to the topic contained in the treatment passage. Thus, nouns such as *ice, penguins*, *Antarctica*, or *rookery,* adjectives such as *inhospitable,* or verbs such as *landed* were coded as content words. All of the items coded as content words could be found within the textual enhancement treatment passage that all participants read. The results obtained can be seen in Table 8.

TABLE 8
Written Recall Frequency Means

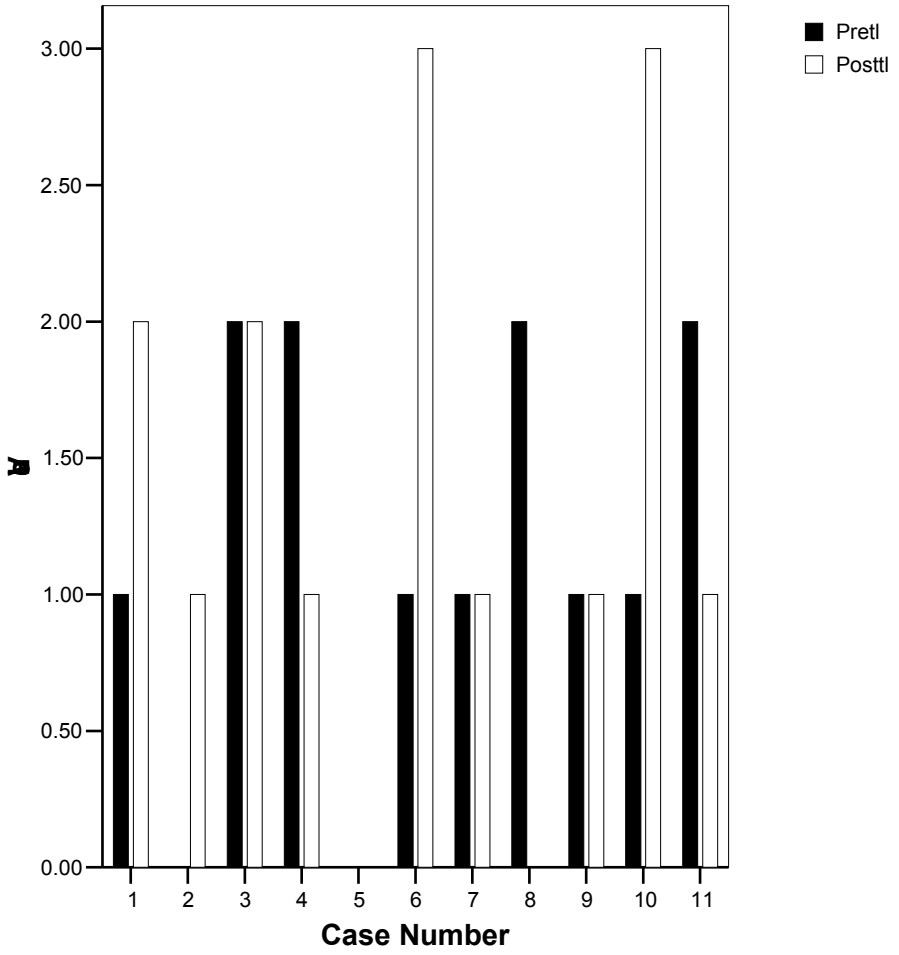
	Total # of words	# of content words	# of target structure
Enhanced Familiar	14.1812	3.6336	1.8181
Enhanced Unfamiliar	5.75	1.375	1.625
Unenhanced Familiar	11.000	3.1667	0.5
Unenhanced Unfamiliar	0.636364	0.090909	0.18182

Overall, the enhanced groups showed a higher mean frequency of targeted linguistic forms in their recalls than the groups that had not received the enhanced text materials. This may indicate a level of noticing, which the increased saliency of the targeted form could have provided. Another interesting occurrence was the increased frequency of the use of content words by the participants who had received the topic familiarity training. Again, this may indicate some beneficial effect of the topic familiarity training upon the participants' comprehension of the text. However, given the small number of participants and the lack of an alternative comprehension measure, any interpretation of the groups as a whole must remain somewhat speculative. In order to glean further insights from the recall data, a qualitative analysis was conducted.

Qualitative Analysis of Written Recall

In the qualitative analysis, the developmental paths of three participants from the experimental groups were analyzed over the course of the treatment. These three participants were chosen not only because they exhibited what the researcher found to be noteworthy behavior vis-à-vis the linguistic target, but also because they completed their recall in the L2 (i.e., English). Also, these participants were female, roughly the same age, and shared Chinese as their L1. One of the participants in experimental Group A (i.e., + enhancement, +topic familiarity) who exhibited the largest gain was ID #6.00 (see Figure 2 for the scores on the pre-test and post-test for the targeted linguistic form +enhancement + topic familiarity group), whom we shall call *T*. At the beginning stage, during the pre-test, this participant scored 1 of the target language items correct and scored 3 correct on the post-test.

FIGURE 2
Number of Correct Items for the Targeted Form on the Pre-test and Post-test for the +Enhancement +Topic Familiarity Group



Note: Pretl and Posttl refer to the scores for the targeted linguistic form on the pre-test and the post-test, respectively.

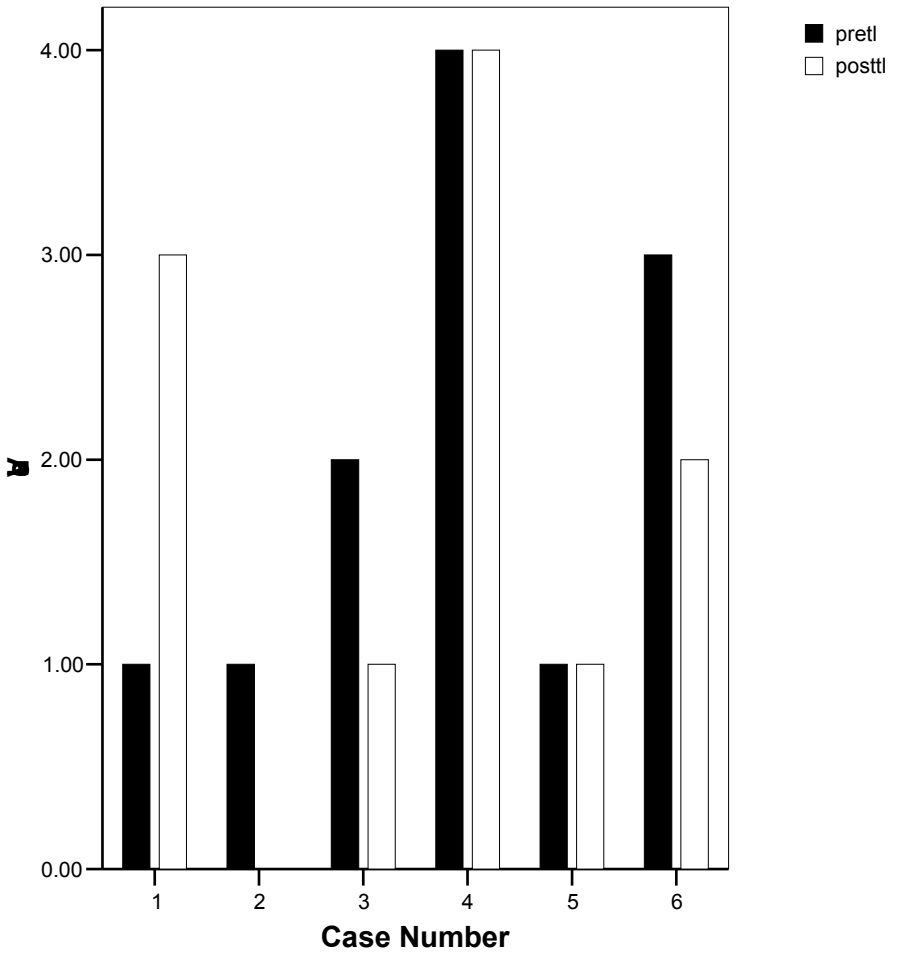
In analyzing her written recall, the researcher found that T had produced a 16-word recall. Within the recall, there were four tokens of the superlative and four content words (non-superlative) that related directly to the penguin stimulus paragraph. T wrote, "It has the longest (superlative) nights (content) and days (content). The south land (content) is the highest (superlative), driest (superlative), coldest (superlative) continent (content)." In analyzing this sample, we can see that T did retain some of the material from the paragraph. However, her recall of the text did not match the content of the paragraph directly. She used a novel formulation not contained in the text itself: "south land." In uncovering the source of this reformulation, a native Mandarin speaker said that it could be the effects of L1 transfer (Liu, personal communication). As the first character of the three-character lexical unit 南极州 is *south* (南), T may have been relying upon translating from the L1 in order to formulate *Antarctica*. As Antarctica was one of the concepts covered during the topic training session, its inclusion at this point may be indicative of a

residual effect of the training, with this particular conceptual item being stored in T's long-term memory in her L1, rather than her L2. Because T read two texts (see the Appendix for the two texts used in the topic familiarity training sessions) during the familiarity training session, she recognized the English word "Antarctica" correctly. However, in producing this in writing, a direct transfer from the L1 occurred.

Another interesting finding in the written recall is that all of the superlatives and content words contained within T's written output in the recall were words (or reformulations) contained in the first paragraph of the treatment paragraph. All of the superlative forms that she recalled were contained within the first two sentences of the recall passage itself. The reliance on these items suggests that T did not process more than the first two sentences of the text. Because of its length, T might have been unable, given the time constraints, to move beyond the very first part of the text. However, T's recall of the tokens may be a sign that she noticed the enhanced forms even if she did not fully process their meaning. Given the increase in T's score, she could possibly have used her noticing of the form in answering items on the post-test. Although given the limited number of target items on the post-test, this remains speculative at best.

In the topic familiar/unenhanced group of subjects, the highest scoring participant of all the participants (ID #4), whom we shall call *K*, showed no gains or losses in her pre- and post-test scores for the targeted linguistic form. Due to the limited number of superlative items on both the pre-test and the post-test, K's performance suffered from an upper limit effect. As K had already reached the highest score possible, K had reached an upper limit or ceiling of her measurable performance on the test. The test, therefore, did not reveal an accurate measure of her knowledge due to the limited number of items it contained. However, in her written recall, we can see not only a good understanding of the text and memory of content words, but there is also correct usage of the superlative. T's recall was "The writer introduced us about Antarctica's (content) coldest (superlative) weather (content) and wildlife (content)-penguin (content)/*rookers* (content)." In this recall we can see five examples of content words and one example of the superlative. This use of the superlative may be a sign that K had learned the target structure earlier and used it here due to its frequency in the passage, a possible effect of input flood. Another point of interest is her use of the word rookers. That she recalled this item may indicate that she did continue to read until the third paragraph, unlike T earlier, and that the footnoted and defined item *rookery*, may have had some perceptual salience of its own as it was the only footnoted and elaborated item. As K was of a higher proficiency level than the other participants as indicated by the pre-test and post-test scores, she also appears to have understood more of the text as well. This may have been a residual effect of the topic familiarity training during which she read two texts which dealt with the same topic as the treatment text. As a comparison, K's results are shown below together with those of the other members of the –enhancement, + topic familiarity training group.

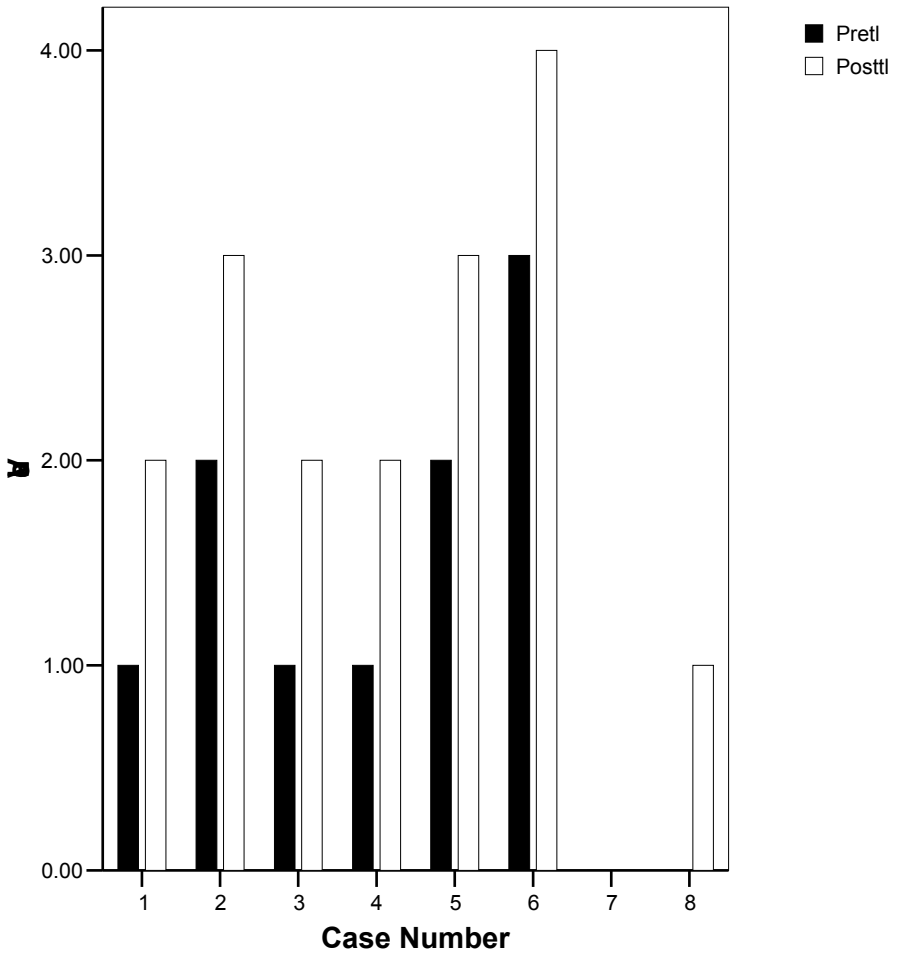
FIGURE 3
Number of Correct Items for the Targeted Form on the Pre-test and Post-test for the -Enhancement +Topic Familiarity Group



Note: Pretl and Posttl refer to the scores for the targeted linguistic form on the pre-test and the post-test, respectively.

In the enhanced/unfamiliar group, another example of a ceiling effect could be seen with another high-scoring participant (ID #6) whom we shall refer to as *S*. S's performance in comparison with other members of the +enhancement, –topic familiarity group can be seen in Figure 4.

FIGURE 4
Number of Correct items for the Targeted Form on the Pre-test and Post-test for the +Enhancement, -Topic Familiarity Group



Note: Pretl and Posttl refer to the scores for the targeted linguistic form on the pre-test and the post-test, respectively.

Although S's written score increased from 3 to 4, a true measure of her performance is necessarily limited by the small number of items on the testing instruments themselves. In her eight-word recall, we can see no content words but there are four instances of the superlative. S's recall was, "It is the coldest, windest, driest, and highest" with the underlining here representing moments where S herself actually underlined the inflectional suffix "–est" which is used for superlatives. At first, it was interpreted as being an example of noticing by S of the highlighted form. However, on a deeper level of S's processing, it shows that S was recalling a rule to which she had been exposed earlier. Because the whole word was highlighted in the text, not just the inflectional suffix, there must have been some internalization of the rule by S prior to her exposure to the text. (In a later comment to the researcher, S said that she was a graduate of a Chinese university and that she had studied "a lot of grammar" there.) Evidence of this prior training manifested itself here with her metalinguistic markings. In her case, the typographical

enhancement served as a trigger for a structural rule to which she had been exposed in an instructional setting.

Summary of Results

The research questions posed in the study will now be reviewed and the results summarized. Neither the typographically enhanced treatment text (research question one) nor the topic familiarity training (research question two) had a significant impact on the acquisition of form as measured by the pre-test and post-test of the linguistic target. Also, due to the limited number of participants in the group receiving treatments (i.e., +IE, +TF), it was not possible to answer research question three. However, there was a great deal of variation within the treatment groups as indicated by the size of the standard deviation in total scores and scores for the targeted linguistic item on the pre- and post-test. This variation was also present within the written recalls. As the quantitative analysis of the written recall demonstrated, participants' performance varied greatly not only in the frequency of appearance of content words and the targeted linguistic forms, but also in the length of the recall itself. A further qualitative analysis revealed that this variation was due in large part to factors such as learner readiness (i.e., S's grammatical training at the university) that were not direct effects of the experimental treatments themselves. A further discussion of underlying issues behind the variation and lack of treatment effects follows.

DISCUSSION

Learner Readiness and Treatment Type

In analyzing the results, the researcher found that the population was highly varied and possessed markedly different levels of language proficiency at the outset. Because the researcher was not allowed access to the participants' placement scores, the variation emerged as the treatment period progressed. As was revealed by the analysis of the students' written recalls, the level of processing of the highlighted form by the ready learners (i.e., those who had prior knowledge of the targeted form) vs. the unready learners varied greatly. As Han et al. (2008) have suggested, there exists a markedly different relationship between ready learners and unready learners. Han et al. point out three areas where the performance of ready learners and unready learners with respect to visual input enhancement diverge: (a) simple enhancement (visual input enhancement alone) which has more of an effect upon ready than unready learners,[3] (b) simple enhancement which may induce noticing without further understanding in unready learners,[4] and (c) compound enhancement (i.e., visual input enhancement in conjunction with more explicit strategies such as corrective feedback and emphatic instruction) which is more effective in causing both ready and unready learners to pay attention to and subsequently process the targeted linguistic form.[5]

In conducting future studies of this kind, a better fit needs to be established between the selected linguistic target form and the readiness level of the population. Due to the limited

[3] Han et al. (2008) note as support that visual enhancement had a larger impact upon the ready learners in Izumi's (2002) study than in Alanen's (1995) or Leow's (2001).
[4] See Alanen (1995) and Jourdenais et al. (1995).
[5] See Doughty (1991) and Williams (1999) for examples of compound treatments having a more robust effect upon attention and subsequent processing of form.

information available to the researcher from the pre-test, and because the participants were new to the school at the outset of the study, it was not possible to establish a clear picture of the participants' readiness level By including additional pre-treatment measures of linguistic knowledge, it would have been possible to better assess the actual effects of the visual input enhancement treatment.

Another important consideration raised by the current study was the type of treatment used (e.g., simple enhancement) and the frequency of the treatment (e.g., a one-shot treatment). In future studies, different types of treatments in addition to visual input enhancement (referred to earlier as compound enhancement) should be used to see if this combination of treatments has a more robust effect on L2 learners. By comparing the effects of simple enhancement to those of compound enhancement, a more complete picture of learner processing will likely emerge.

Additionally, as has been described earlier, the impact of a one-shot treatment has necessarily limited effects. As Han et al. (2008) emphasize, implicit instructional approaches—such as visual input enhancement—require a longer experimental timeframe in order for the effects to be truly measurable. By carrying out a number of treatments in a longitudinal time frame, researchers can obtain a more nuanced understanding of the nature of visual input enhancement and its impact on groups as well as on individual learners.

Data Elicitation and Measuring the Effect of Visual Input Enhancement

One interesting finding in the present study involved the use of qualitative analysis of the written recalls and the more detailed view it provided on the performance of individual learners throughout the study. In addition to the type of written recall used in the present study, which was discussed earlier, a variety of different tasks (Gass & Mackey, 2007), which can be employed in order to obtain insights into the learners' cognitive processing, have been identified *inter alia:* think-aloud protocols, diaries, and retrospective verbal reports. Such measures provide the researcher with a broader picture of learner processing by allowing for an examination of multiple sources of introspective data during the learner's interaction with a particular pedagogical treatment such as textual enhancement. As Leow (2001), Leow et al. (2003), and Leow and Morgan-Short (2004) have advocated, there is a need for more concurrent or online data to better examine the thought processes that the learner is experiencing while performing a task. Although the problem of reactivity has been a concern (see Leow & Morgan-Short, 2004), think-aloud protocols, when conducted in a careful fashion (see Gass & Mackey, 2007 for a more detailed discussion), can enable researchers to gain an insight into the individual learners' thinking processes. In the present study, however, given the demands of the tasks themselves and the participants' proficiency level, a think-aloud protocol could have been somewhat overwhelming. A second method to consider, especially in longer range studies, is the use of learner diaries. As demonstrated in Schmidt and Frota (1986), the use of a diary allowed the participant to discuss language-related episodes[6] both in and outside the classroom. Nevertheless, the value of such data would largely depend upon the individual participants' descriptive abilities, the manner in which the task was introduced, and the kinds of guidelines that were followed. A third way would be a retrospective oral report of performance following the playing of a recording or video of the individual participant when carrying out a particular task (Gass & Mackey, 2000). The use of such a stimulated verbal report could allow participants to reflect upon, and better describe, a particular episode during the treatment process. In any event, in future studies, multiple measures of

[6] Schmidt and Frota's (1986) participant noticed gaps between his performance and the target language

individual learners' thought processes would provide a richer and more complex view of the impact of a particular treatment, such as visual enhancement.

The Effects of Visual Input Enhancement upon Comprehension

Another intriguing implication of the present study is the effect of an implicit treatment, such as input enhancement, on comprehension. Although the present study did involve a meaning-based treatment with post-treatment tasks for those who received topic familiarity training, it is necessary to measure participant comprehension more accurately. As shown in the two previous studies of visual input enhancement and topic familiarity (Lee, 2007; Overstreet, 1998), there appears to be a trade-off between input enhancement and comprehension, where input enhancement seems to adversely affect comprehension. Because of findings such as these, as Han et al. (2008) suggest, future experiments need to investigate comprehension at a local level, as an independent variable, to be measured pre and post treatment at within-group as well as between-group levels. By conducting such research, it would be possible to obtain a better informed understanding of the nature of visual input enhancement in relationship to comprehension. As Han (2003) and VanPatten (2004) emphasize in their acquisition/instructional models, there is an interaction between semantic processing and syntactic processing during the reading process, and in order to effectively distinguish the effects of a given instructional treatment (such as visual input enhancement), future research needs an adequate measure of both types of processing—for meaning and for form.

Limitations of the current study

As the data analysis has demonstrated, the present study suffered from several administration and procedural problems. One primary problem was the lack of a linguistically sensitive second pre-test after the first pre-test had been administered to choose the linguistic target. Because of the lack of a second pre-test, the target structure was measured with only four items in the pre-test and the post-test, which provided an inadequate picture of the participants' performance. In future studies of this kind, both a pre-test and a post-test containing more examples of the target structure are necessary. Had such a pre-test and post-test been administered, it may have been possible to avoid the ceiling effect observed in the qualitative analysis of two participants.

Another procedural problem can be found with the treatment text. In the written recalls, it was found that to a number of participants the text was too difficult and lengthy, so the participants, therefore, failed to provide an adequate recall of the material. A shorter text with less lexical complexity and/or length may have yielded more solid results. In addition to text length, more explicit instructions in the written recall may have elicited longer responses from the participants. Also, the choice of participants used for the qualitative analysis of the recalls may have created problems, since subjects such as K had already reached the highest level of performance that could be measured by the linguistic pre- and post-tests.

The timing and sequence of the tasks raised more issues as well. Due to the limited nature of the study's task times, some participants were unable to adequately complete the tasks which led to limited results. In future studies of this type, the participants should perhaps be given more time to complete individual tasks. This would permit a more revealing glimpse into the participants' thought processes. Another related problem with the present study may have involved an overload

of tasks in one particular session. Because of the cognitive demands of the tasks, spacing the tasks out and allowing for longer completion time may have lessened the participants' cognitive processing demands. Fifteen minutes to read the 347-word treatment text, and then to complete the written recall as well as the linguistic post-test in the remaining 35 minutes of a 50-minute testing schedule, was a somewhat inadequate time frame given the level of the students and the demands they were facing.

CONCLUSION

The present study did not show a measurable and statistically significant effect of input enhancement or topic familiarity, or a combination effect of the two, due to a number of factors which have been outlined above. The most important of those factors were problems which arose during the administration of the treatment itself. Also certain features of the study's design, such as a one-shot treatment and the lack of an adequate measure of learner readiness, contributed to the highly limited nature of the results of the study. However, the study did provide an interesting glimpse into the various processing strategies that participants use in responding to the same stimulus material. By tracing the path of three participants through the experimental process, progress (or lack of progress), as reflected in the qualitative analysis of the written recalls, appeared to be contingent upon several factors such as learner readiness and treatment type, not merely the treatment itself. In future studies of this type, researchers need to examine participant responses not only as a group, but also as individuals. Such an approach would provide a more complete picture of the learner as s/he engages in a particular activity designed to affect the acquisition process.

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APPENDIX

TABLE 9
Pre-test Scores for Choice of Linguistic Target

Question number -Multiple Choice Pre-test	Linguistic Structure	Mean Score
1	Present progressive	0.83333
2	Intensifier (too)	0.694444
3	Present simple	0.694444
4	Question formation-Present simple	0.61111
5	Adjectives	0.63888
6	Future	0.6994
7	Question formation-Present simple	0.722222
8	Count-Noncount Quantifying adjectives	0.77778

9	Count-Noncount Quantifying adjectives	0.61111
10	Present simple	.0694444
11	Question formation-Present simple	0.77778
12	Infinitives	0.66667
13	Question formation-Present simple	0.63888
14	Possessive adjectives	0.611111
15	Articles, Count/Noncount nouns	0.75
16	Question formation Present progressive	0.58333
17	Superlative	0.55556
18	Modals	0.75
19	Superlatives	0.333333
20	Negative-Present simple	0.583333
21	Question formation-Present simple	0.75
22	Past irregular- question formation	0.47222
23	Past irregular-question formation	0.63889
24	Past tense	0.80556
25	Paste tense irregular	0.555666
Cloze Test Pre-test Question Number	**Linguistic Structure**	**Mean Score**
1	Intensifier	0.722222
2	Future	0.666669
3	Question formation-Simple present	0.75
4	Question formation-Count/Noncount nouns	0.777778
5	Superlatives	0.305566
6	Past tense	0.63889
7	Count/Noncount nouns	0.63889
8	Adjectives	0.66667
9	Past	0.555666
10	Possessive pronouns	0.8889
11	Count/Noncount nouns-Question formation	0.75
12	Count/Noncount nouns-Question formation	0.63889
13	Past	0.63889
14	Modals	0.5

15	Future	0.61111
16	Comparisons	0.55556
17	Past tense-Question formation	0.5
18	Count/Noncount nouns-Question formation	0.5556
19	Present simple	0.6667
20	Modals	0.833333
21	Prepositions	0.52778
22	Future	0.52778
23	Infinitives	0.5
24	Possessive Adjectives	0.7778
25	Superlatives	0.25

TABLE 10
Pre-test Scores for Choice of Topic Familiarity Training

Topic	Mean score- Part 1	Mean score-Part 2	Mean score-part 3
The Iraq War	1.833	1.8333	0.6667
Jennifer Lopez	1.5	0.5	0.5
2004 World Series	1.667	0.667	1.1667
The Bush Family	2.0	1.833	1.1667
Penguins	1.333	0	0.1667
Academy Awards 2004	1.333	0.667	0.1667
Portuguese Cod Dishes	1.0	0	0.1667
Geology of the Moon	1.333	0	0.1667
Michael Bloomberg	1.5	1.333	1.3333
Seeing eye dogs	1.5	0.3333	0.8333

Linguistic Pre-test

First Day at the Office

Please fill in the circle next to the answer that best completes the sentence.

1. Al: Hi. Can you help me. I'm looking for the sales department?
   Lee: Just follow me. That's where I _____.
   - go
   - going
   - am going
   - goes

2. Al: Well thank you very much. Is it far?
   Lee: No, it's not _____ far. We'll be there in five minutes.
   - too
   - to
   - two
   - too much

3. Al: By the way, my name's Al.
   Lee: Pleased to meet you, Bob. My name's Lee. I _____ my first day here. I was lost, just like you.
   - am remembering
   - remembered
   - remembers
   - remember

4. Al: I'm from Brooklyn. _____
   Lee: The Bronx.
   - Where are you?
   - Who are you?
   - Where are you from?
   - Where are you coming from?

5. Al: What job are you going to do here?
   Lee: Data processing. I am very _____ in computers .
   - interesting
   - interest
   - interests
   - interested

6. Al: That must be very interesting. What _____ after work today?
   Lee: Watch TV, probably. But I may go to the movies.
   - do you do
   - you doing
   - will you do
   - did you do

7. Al: So tell me what _____ of this company. Do you like it?
   Lee: Yes, very much. I feel very much at home here.
   - you are thinking
   - you think
   - are you thinking

- do you think

8. Al: I hope there is a lot of work to do. I don't want to spend all my time sitting around.
   Lee: Don't worry. There are _____ clients. You won't get bored.
   - a lot of
   - any
   - much
   - few

9. Al: Where can I get _____ about health insurance?
   Lee: In the human resources office.
   - some information
   - some informations
   - informations
   - any informations

10. Al: Ah! That must be the office cafeteria. Do you know if it _____ a microwave oven?
    Lee: Of course. The cafeteria has everything.
    - there are
    - has
    - have
    - there is

11. Al: _____ is the parking garage?
    Lee: It's very big. It has 10 levels.
    - What
    - What big
    - How big
    - What is the size

12. Al: I suppose I need an employee ID card _____ use the parking garage.
    Lee: Yes, and also when you enter the building.
    - I
    - for
    - for to
    - to

13. Al: _____ any banks around here?
    Lee: Yes, many. This area is really convenient.

- Are there
- There are
- They have
- Have

14. Al: Are you living alone?
    Lee: No. I'm sharing an apartment with my _____. She works here too.
    - sister's boyfriend
    - boyfriend's sister
    - the boyfriend's sister
    - the sister's boyfriend

15. Al: Does your boyfriend work here too?
    Lee: No he doesn't. He's a student. He's studying _____.
    - languages
    - the languages
    - the language
    - any languages

16. Al: Tell me, what are my chances of finding a cheap place nearby?
    Lee: Well, that depends. _____ for an apartment in Manhattan?
    - You look
    - You are looking
    - Do you look
    - Are you looking

17. Al: Yes, if it's not too expensive.
    Lee: Apartments in Manhattan are very expensive. In fact, they are probably _____ apartments in the country.
    - the most expensive
    - most expensive
    - more expensive
    - the more expensive

18. Al: That's too bad.
    Lee: Well, there is a very good transportation system, so you _____ live near here.
    - shouldn't
    - mustn't

- don't have to
- can't

19. Al: No. I prefer to live near the office, that it is the_____ way. I have to find another someone to share an apartment with me.
Lee: I think it's the only way.
- cheaper
- cheapest
- most cheapest
- mostest cheap

20. Al: What's the weather like here in the winter? Does it rain a lot?
Lee: No, it _____ very much, but we have some snow from time to time.
- isn't raining
- doesn't rain
- didn't rain
- don't rain

21. Al: Tell me, what _____ here after work?
Lee: Some do sports, some party, some have families, and go home. There are a lot of things to do.
- do people do
- do people
- people do
- does people do

22. Lee: So tell me, Al. Why _____ to work here?
Al: I like the salary and my parents worked here.
- you choose
- you chose
- did you choose
- did you chose

23. Al: Did you hear about this job from a friend?
Lee: No, from the internet. My friends_____ about it
- didn't tell
- didn't speak
- not tell

- ○ no tell

24. Lee: Did you have the opportunity to visit the head office in San Francisco?
    Al: Yes, I _____ there last year.
    - ○ was
    - ○ were
    - ○ am going
    - ○ am gone

25. Lee: Well here's the sales department. I wish you the best of luck in your new job.
    Al: Thank you. It was nice meeting you, Lee, and thanks for all the information. It's only my first day and you _____ me so much about the company.
    Lee: You're welcome. See you later.
    - ○ teach
    - ○ thought
    - ○ did teach
    - ○ taught

Directions: Please complete each sentence by writing the missing word in the space.

1. It is _____ hot in this room. Could you open the window?
2. What _____ for dinner tonight?
3. _____ are your children? Mine are 7 and 10.
4. _____ people live in your building?
5. New York City is the _____ city in the USA.
6. I _____ some new clothes at Macy's last weekend.
7. We only have _____ money left, so I don't think we can go to Florida for vacation this year.
8. I don't like American movies very much because they aren't very _____.
9. I _____ very sick yesterday.
10. Your house is really big. _____ is really small.
11. Do you have any _____ about sightseeing in London?

12. How many _____ does Miguel speak?

13. You _____ tired today.

14. We _____ get the car fixed or we won't be able to go anywhere next weekend.

15. I love big cars. I _____ one next year.

16. Wall Mart is _____ than Macy's. I got this pair of pants for $10.00

17. Where _____ for vacation last summer? I went to Portugal.

18. _____ coffee do you drink everyday?

19. _____ 20 students in my English class.

20. You are really getting fat. You _____ go on a diet.

21. Where does Mike come _____? He isn't American.

22. I _____ to church next Sunday.

23. I am so busy I have too much work _____ finish.

24. Mike is really rich. _____car is really expensive.

25. Let me help you. I know that mathematics is the _____ subject that we have this semester.

Topic Familiarity Pre-test

What do I know about this topic?

Part 1-Directions: For this task I would like you to indicate how much you know about the topic. A number 5 means that you know **almost everything** about the topic. A number 4 means you know **a lot** about the topic. A number 3 means that you know **something** about the topic. A number 2 means that you know a **little** about this topic. A number 1 means that you do not know **anything** about the topic. Thank you!

1. The Iraqi War 1 2 3 4 5

2. Jennifer Lopez 1 2 3 4 5

3. The 2004 World Series	1	2	3	4	5
4. The Bush Family	1	2	3	4	5
5. Penguins	1	2	3	4	5
6. Academy Awards 2004	1	2	3	4	5
7. Portuguese Cod Dishes	1	2	3	4	5
8. The geology of the moon	1	2	3	4	5
9. Michael Bloomberg	1	2	3	4	5
10. Seeing eye dogs	1	2	3	4	5

Part 2-Directions For each prompt write any words that come to mind that you associate with this topic.

1. The Iraqi War

2. Jennifer Lopez

3. The 2004 World Series

4. The Bush Family

5. Penguins

6. Academy Awards 2004

7. Portuguese Cod Dishes

8. The geology of the moon

9. Michael Bloomberg

10. Seeing eye dogs

Part 3-Directions: Please read the words are associated with each topic. If you **know** the word, **circle it**. If you **do not know** the word, **do not circle it.**

1. The Iraqi War- Saddam Hussein
sanctions
Weapons of Mass Destruction (WMD's)
insurgents
occupation government

2. Jennifer Lopez- The Bronx
Selena
Marc Anthony
Maid in Manhattan
Ben Affleck

3. 2004 World Series- Boston Red Sox
St. Louis Cardinals
Babe Ruth's curse
Manny Ramirez
Pedro Martinez

4. The Bush Family- Yale University
Midland, Texas
legacy
Republican Party
Jenna and Barbara

5. Penguins- flightless
Antarctica
krill
preening
gregarious

6. Academy Awards 2005- Oscar

Million Dollar Baby
Hillary Swank
supporting actor
leading role

7. Portuguese cod dishes- cod
cilantro
paprika
stew
soak

8. Geology of the Moon- craters
accretion
crust
core
domes

9. Mayor Michael Bloomberg- mayor
Wall Street
Financial news
Republican
billionaire

10. Seeing eye dogs-
guide dog
blind
visually impaired
commands
obedience

Topic Familiarity Training Materials

Pre-reading task (text one)

Directions: Try to answer these questions before you read the short paragraph.

1) What kind of bird is this?

2) What do these birds eat?

3) How many eggs does it lay? What color are the eggs?

4) Who feeds the young chicks?

Reading text one

Some species of penguin can dive as deep as 500 meters deep for 15- 20 minutes at one time. The average dive is 100m deep and last for 5-7 minutes. Some penguins can swim as fast as 7 mph. Most penguins have a white breast and a black head and back. Some species exhibit yellow, red or orange on their head or neck. Penguins can not fly and are therefore are highly specialized swimmers. Penguins have a waterproof layer of feathers. When penguins molt their feathers they

do not eat. The molting period can last for several weeks. Penguins feed on fish, cuttlefish, crustaceans, krill and other small sea animals. Predators of the penguins are Leopard Seals, Killer Whales and for young penguins and chicks, skuas. Penguins vary in their nesting methods. Some build nest and some don't build nests. Most penguins lay a clutch of two eggs, which can be white or greenish in color.

http://www.hu.mtu.edu/~mmcooper/classes/penguins.html

After-reading task (text one)

Directions: Now answer these questions based on the reading you have completed.

1) What kind of bird is this?

2) What do these birds eat?

3) How many eggs does it lay? What color are the eggs?

4) Who feeds the young chicks?

Pre-reading task (text two)

Directions: Try to answer these questions before you read the short paragraph.

1) How do penguins communicate?

2) Why do penguins walk with an erect posture?

3) How do they move in the snow?

Reading text two

Penguins communicate through complex behaviors such as head and flipper waving called preening, gesturing or bowing. Penguins walk with a very erect posture because their legs are so far down on their bodies. On shore they waddle and hop over rocks; on snow they push themselves and slide on their stomachs to move. Antarctic penguins have developed amazing ability to leap out of the water to reach high ice and rock ledges.

http://www.hu.mtu.edu/~mmcooper/classes/penguins.html

After-reading task (text two)

Directions: Now answer these questions based on the reading you have completed.

1) How do penguins communicate?

2) Why do penguins walk with an erect posture?

3) How do they move in the snow?

Treatment text

Directions: Please read the text.

Antarctica is a continent of superlatives. It is the ***coldest, windiest, driest, iciest*** and ***highest*** of all the major landmasses in the world. It is the continent with the ***longest*** nights and the ***longest*** days and it is home to the world's ***greatest*** concentration of wildlife. It is also one of the last true wilderness areas left on earth – largely unchanged since the early explorers and whalers first landed on its inhospitable shores less than two centuries ago.

Our journeys occur at the peak of the summer wildlife season. Bathed in long hours of daylight, the area will be erupting with wildlife activity. Millions of penguins gather to tend their fast-growing chicks; whales are seen in great numbers, seals haul out onto ice floes and beaches, and numerous albatrosses and other seabirds trail in our wake. We explore historic sites from the Heroic Age of early Antarctic exploration and visit scientists working in modern research bases. And there is plenty of time to enjoy the sheer beauty and the breathtaking scenery of ice-choked waterways, blue and white icebergs, impressive glaciers and rugged snow-capped mountains.

Few people have been fortunate and privileged enough to experience an Emperor Penguin rookery[7]. The ***largest*** of the penguins, Emperors are the only birds that breed on the frozen sea. During this extraordinary voyage we will visit their rookeries on endless expanses of pack ice, surrounded by stunningly sculpted tabular icebergs.

Our visit is perfectly timed to coincide with large numbers of delightful penguin chicks huddling together on the ice. From our ***closest*** approach by ship, we walk over the ice to the rookeries or, taking great care not to cause any disturbance, use the helicopter to land at a safe distance nearby.

But there is even more to this voyage than Emperor Penguins and, during the trip, we hope to experience some other extraordinary penguin rookeries: Royal Penguins, King Penguins and Adélie Penguins among them. We expect to see several different Antarctic seal species, whales, and a wide variety of other wildlife and some of the most spectacular scenery on Earth.

Linguistic Post-test

First Day in New York City.

Please fill in the circle next to the answer that best completes the sentence.

1. Al: Hi. Can you help me? I'm looking for the Empire State Building?
   Les: Just follow me. That's where I _____.

go
going
am going
goes

2. Al: Well thank you very much. Is it far?

[7] Rookery: A nesting area for penguins.

Les: No, it's not _____ far. We'll be there in five minutes.

- too
- to
- two
- too much

3. Al: By the way, my name's Al.
   Les: Pleased to meet you, Bob. My name's Les. I _____ in the Bronx. Where do you live?
   - living
   - lived
   - lives
   - live

4. Al: I'm from Ohio. I _____ my grandmother in Brooklyn. She's 90 years old.
   Les: Wow, that's old
   - am visiting
   - visit
   - have visited
   - would visit?

5. Al: What places should I see here?
   Les: I like the museums. Are you very _____ in art ?
   - interesting
   - interest
   - interests
   - interested

6. Al: Yes I am. What time_____ tomorrow?
   Les: Tomorrow is Monday so I think most of them are closed.
   - did the museums open
   - museums opening
   - will the museums open
   - have the museums opened

7. Al: So tell me what _____ of the city. Do you like it?
   Les: Yes, very much. I feel very much at home here.
   - you are thinking

- you think
- are you thinking
- do you think

8. Al: I hope there are a lot of things to do. I don't want to spend all my time sitting around.
   Les: Don't worry. There are _____ exciting things to do. You won't get bored.
   - a lot of
   - any
   - much
   - few

9. Al: Where can I get _____ about where to go?
   Les: At the tourist information office.
   - some advice
   - some advices
   - advices
   - any advice

10. Al: Ah! That must be Macy's. Do you know if it _____ a coffee shop?
    Les: Of course. It is a really big store.
    - there are
    - has
    - have
    - there is

11. Al: _____ is it?
    Les: It's very big. It has two buildings and ten floors
    - What
    - What big
    - How big
    - What is the size

12. Al: I suppose I need a car _____ go to New Jersey.
    Les: No, you don't. You can take the train.
    - on
    - for
    - for to
    - to

13. Al: _____ any restaurants around here?
    Les: Yes, a lot. This area is really popular
    - Are there
    - There are
    - They have
    - Have they

14. Al: Do you work around here?
    Les: Yes. I work with my _____. She lives near here too.
    - husband's father
    - husband's brother
    - husband's cousin
    - the sister's boyfriend

15. Al: Does your husband work here too?
    Les: No he doesn't. He's a teacher. He teaches _____ at a high school.
    - sciences
    - the sciences
    - science
    - any science

16. Al: Tell me, what are my chances of finding a good souvenir shop nearby?
    Les: Well, that depends. _____ for something cheap or something expensive?
    - You look
    - You are looking
    - Do you look
    - Are you looking

17. Al: Something not too expensive.
    Les: The shops around here are very expensive and small. Times Square has _____ souvenir shops in the city.
    - the biggest
    - the more big
    - the most biggest
    - the more bigger

18. Al: Is that far?
    Les: Well, there is a very good transportation system, so it _____ take a long time to get there.

- shouldn't
- mustn't
- don't have to
- can't

19. Al: So I guess that the subway is the_____ way to get there
    Les: Yes, I think it's the best way.
    - fastest
    - most faster
    - most fastest
    - mostest fast

20. Al: What's the weather like here in the summer? Does it rain a lot?
    Les: Yes, it _____ a lot sometimes, but we have some sun from time to time.
    - raining
    - doesn't rain
    - rains
    - is raining

21. Al: Tell me, what _____ here in the summer?
    Les: Some do sports, some party, some have families, and go to the beach. There are a lot of things to do.
    - do people do
    - do people
    - people do
    - does people do

22. Les: So tell me, Al. Why _____ to live here?
    Al: I like the city and my family works here.
    - you want
    - you wanted
    - do you
    - did you want

23. Al: Would you like to live here?
    Les: Well New York is a fun place, but it is _____ than other places I've been to.
    - the noisiest
    - noisier

- noisy
- more noisy

24. Les: Did you have the chance to visit Ohio?
    Al: Yes, I _____ there last year.
    - went
    - were
    - am going
    - am gone

25. Les: Well here's the Empire State Building. I hope you enjoy your stay in New York.
    Al: Thank you. It was nice meeting you, Lee, and thanks for all the information. It's only my first day and you _____ me so much about the city.
    Les: You're welcome. Bye.
    tell
    told
    did tell
    telled

Directions: Please complete each sentence by writing the missing word in the space.

26. This soup is _____ spicy. I can't eat it.

27. What _____ for your birthday present?

28. _____ are your parents? Mine are in their sixties.

29. _____ people live in China?

30. Mount Everest is the _____ mountain in the world.

31. I _____ read the newspaper yesterday.

32. We only have _____ food in the refrigerator. We need to go to the supermarket.

33. I like computers. I am very _____ in them.

34. I _____ really happy last weekend.

35. Your dog is really friendly. _____ is really mean.

36. Can you give me some _____ with my homework ? I don't understand it at all.

37. How many _____ is Carlos taking this semester?

38. You _____ sleepy today. How many hours did you sleep last night?

39. We _____ get the TV repaired or we won't be able to watch the game on Sunday.

40. I want a new truck. I _____ one next year.

41. K Mart is _____ than Bloomingdale's. I bought a new suit for $50.

42. Where _____ have dinner last night? I went to Kentucky Fried Chicken.

43. _____ cigarettes do you smoke everyday?

44. _____ 100 apartments in my building.

45. You need to save money. You _____ get another job.

46. Where does Miki come _____? She isn't French

47. I _____ to school tomorrow morning.

48. I am so tired. I have too many things _____ do.

49. Michelle is really poor. _____car is very old and ugly.

50. I must be the _____ person in the class. I don't have any money.